

Listing of Claims:

This listing of the claims will replace all prior versions and listings of claims in the application. No claims are amended; this listing is presented for the convenience of the Examiner.

1. (Previously Presented) A voice feature extraction device comprising:
a noise reduction system coefficient calculation unit that adds a simulated voice signal to a surrounding signal, and calculates a noise reduction system coefficient of a noise reduction system, and
an input voice power spectrum calculation unit that calculates a power spectrum vector of a power spectrum signal produced from an input voice signal, wherein

the noise reduction system that is set to the coefficient calculated by the noise reduction system coefficient calculation unit executes a noise reduction processing on the power spectrum vector.

2. (Original) A voice feature extraction device as claimed in claim 1, wherein the noise reduction system coefficient calculation unit includes a filter coefficient calculation unit that determines a filter coefficient of the noise reduction system to be used, and a power calculation unit that converts the filter coefficient acquired by the filter coefficient calculation unit into the power spectrum vector.

3. (Previously Presented) A voice feature extraction device as claimed in claim 2, wherein the filter coefficient calculation unit executes an adaptive control to a signal having the surrounding signal and the simulated voice signal added, and acquires a tap coefficient to thereby calculate the filter coefficient.

4. (Original) A voice feature extraction device as claimed in claim 3, wherein a specific gain adjustment is executed to the simulated voice signal.

5. (Original) A voice feature extraction device as claimed in claim 1, wherein the voice feature extraction device is applied to a voice recognition device of a vehicle navigation system.

6. (Original) A voice feature extraction device as claimed in claim 1, wherein the voice feature extraction device is applied to a speaker recognition device.

7. (Original) A voice feature extraction device as claimed in claim 1, wherein the voice feature extraction device is applied to a loudness compensation system.

8. (Previously Presented) A voice feature extraction device comprising:
a noise reduction system coefficient calculation unit that,
adds a simulated voice signal to a surrounding signal, and calculates a noise reduction system coefficient of a noise reduction system, and
a microphone that collects an input voice signal of a user,
a window function operation unit that samples the voice signal inputted from the microphone, and prevents generation of high frequency components caused by a data jump at intervals of each frame,
an input voice signal power spectrum calculation unit that calculates a power spectrum vector of the input voice signal processed by the window function operation unit, and
a noise reduction system that is set to the coefficient calculated by the noise reduction system coefficient calculation unit, and executes a noise reduction processing on the power spectrum vector.

9. (Original) A voice feature extraction device as claimed in claim 8, wherein the noise reduction system coefficient calculation unit includes a filter coefficient calculation unit that determines a filter coefficient of the noise reduction system to be used, and a power calculation unit that converts the filter coefficient acquired by the filter coefficient calculation unit into the power spectrum vector.

10. (Previously Presented) A voice feature extraction device as claimed in claim 9, wherein the filter coefficient calculation unit executes an adaptive control to the signal having the surrounding signal and the simulated voice signal added, and acquires a tap coefficient to thereby calculate the filter coefficient.

11. (Previously Presented) A voice feature extraction device as claimed in claim 9, wherein the filter coefficient calculation unit executes a specific gain adjustment to the simulated voice signal, executes an adaptive control to a signal having the surrounding signal and the gain-adjusted simulated voice signal added, and acquires a tap coefficient to thereby calculate the filter coefficient.

12. (Previously Presented) A method of extracting voice features comprising:

adding a simulated voice signal to a surrounding signal;

calculating a noise reduction system coefficient of a noise reduction system to be used, and

calculating a power spectrum vector of a power spectrum signal produced from an input voice signal,

wherein the noise reduction system that is set to the calculated noise reduction system coefficient executes a noise reduction processing on the power spectrum vector, and extracts the voice features.

13. (Previously Presented) A method of extracting voice features as claimed in claim 12, wherein the noise reduction system coefficient is calculated by determining a filter coefficient of the noise reduction system, and by calculating a power spectrum vector from the determined filter coefficient.

14. (Previously Presented) A method of extracting voice features as claimed in claim 13, wherein the filter coefficient is calculated by executing an adaptive control to a signal produced by adding the surrounding signal and the simulated voice signal to acquire a tap coefficient.

15. (Original) A method of extracting voice features as claimed in claim 14, wherein a specific gain adjustment is executed to the simulated voice signal.

16. (Previously Presented) A method of extracting voice features comprising:

- adding a simulated voice signal to a surrounding signal;
- calculating a noise reduction system coefficient of a noise reduction system, and
- sampling a voice signal inputted from a microphone,
- executing a processing to prevent generation of high frequency components of the input voice signal sampled,
- calculating a power spectrum vector of a power spectrum signal produced from the input voice signal that is processed to prevent generation of high frequency components, and
- calculating a voice feature from the power spectrum vector via the noise reduction system that is set to the calculated noise reduction system coefficient.

17. (Previously Presented) The method of extracting voice features as claimed in claim 16, wherein the noise reduction system coefficient is attained by:

- executing an adaptive control to the added signals to thereby calculate a filter coefficient, and
- applying a fast Fourier transform to the filter coefficient to thereby calculate the power spectrum vector.

18. (Previously Presented) A voice feature extraction device comprising:

- a microphone that collects a surrounding signal;
- a simulated voice signal generation unit that generates a simulated voice signal;
- a gain adjustment unit that adjusts a gain of the simulated voice signal;
- an adder that adds the surrounding signal collected by the microphone and the gain-adjusted simulated voice signal;
- a delay processing unit that delays the gain-adjusted simulated voice signal by a predetermined time;

an adaptive filter that executes an adaptive control on the signals added by the adder and the simulated voice signal delayed by the delay processing unit, and generates a filter coefficient;

an FFT operation unit that executes a fast Fourier transform on the filter coefficient generated by the adaptive control of the adaptive filter;

a power calculation unit that calculates a power spectrum vector from a power spectrum signal calculated by the FFT operation unit; and

a noise reduction system having the power spectrum vector calculated by the power calculation unit set as a noise reduction coefficient.